USGS
science for a changing world

Alaska Tissue Archival Projects

The goal of the **Alaska Marine Mammal Tissue Archival Project (AMMTAP)** is to collect tissue samples from Alaska marine mammals under near sterile conditions so that they can be analyzed for environmental contaminants and other constituents.

The USGS, Alaska Biological Science Center, is cooperating with NOAA Fisheries' Office of Protected Resources and the National Institute of Standards and Technology (NIST), to conduct this project. AMMTAP collections began in 1987 as part of the Outer Continental Shelf Environmental Assessment Program.

The Seabird Tissue Archival and Monitoring Project (STAMP) is a developing related project for 1999 which will mirror the AMMTAP in purpose and procedure. Stamp is a partnership of USGS, NIST, and the U.S. Fish and Wildlife Service.

Tissues collected for AMMTAP archival are primarily liver, fat (blubber), and kidney. Blood, muscle, and other tissue types, as well as bile, are sometimes collected for special purposes. Teeth and claws are collected for age determinations and additional tissue samples are collected for histopathology. Currently only eggs are collected under the STAMP.

Sampling procedures are standard for each species. Tissue samples are collected from freshly killed animals taken by subsistence hunters, animals accidentally caught in fishing nets, or animals that strand alive (e.g., Cook Inlet beluga whales). One 300-g sample (12x7 cm) of each tissue-type (liver, fat, kidney, and sometimes muscle) is taken from each animal.

AMMTAP sampling follows exacting protocols. These procedures are presented in two NIST publications: NBSIR 88-370 (1988) and NISTIR 4529 (1991). The steps used to take the samples are carefully recorded from the moment the animal expires until the samples reach the specimen bank. Specially designed equipment (e.g., titanium and Teflon tools, Teflon sample containers, special gloves, etc.) assures clean uncompromized sampling.. Samples are frozen in liquid nitrogen and shipped to the National Biomonitoring Specimen Bank.

The National Biomonitoring Specimen Bank (NBSB) is part of NIST. In 1999, marine samples archived previously in Gaithersburg, Maryland will be moved to a NIST satellite specimen bank facility in Charleston, South Carolina.

The specimen bank maintains collections of environmental samples that can be analyzed in the future as new and better techniques for chemical analysis are developed, and if and when new contaminants appear in the environment. Half of each sample in the NBSB is archived for

Specimens Archived to Date

Species	Location	Years	Species	Location	Years
N. fur seals	St. Paul	87,90,97	Beluga whales	Point Hope	89,97
Ringed seals	Barrow	88,91,94-99		Point Lay	90,96,99
	Nome	89,91,93-99		Cook Inlet	92,94-96,98
Bearded seals	Barrow	89,96		Nome	96
	Nome	89,93,94,98-99	Bowhead whales	Barrow	92-94,96-97
Harbor seals	Prince William Sound	90,94	Polar bears	Barrow	96-99
	Cook Inlet	94,97	Seabird eggs	Cape Lisburne	98
	Aleutian Is.	96-97		St. George	98-99
Spotted seals	Nome	91,96		Barren Is.	98-99
Stellar sea lions	Cook Inlet	90		St. Lazeria	98-99
	Aleutian/Pribilof	97		Diomede	99
Walrus	Nome & St. Lawrence Is.	93-99			
	Round Is.	96,98			

U.S. Department of the Interior
U.S. Geological Survey
Biological Resources Division
November 1999

For more information on AMMTAP research, contact:
Geoff York
(907)786-3928
FAX (907)786-3636
E-Mail: geoff_york@usgs.gov

Alaska Biological Science Center
1011 E. Tudor Rd.
Anchorage, Alaska 99503
Home Page: http:\\www.absc.usgs.gov

long-term storage and future analysis. The other half is available for immediate analysis. The NBSB also maintains all the data and information associated with these samples (e.g., results of analyses, measurements of the animals from which the samples were taken, etc.)

The sample archival procedures insure stability during long-term storage. Samples are stored in the NBSB at -150 °C (-238 °F). This low temperature is required to minimize sample changes during storage.

AMMTAP coordinates with and has provided information on contaminants in marine mammals to many organizations, including: the North Slope Borough Department of Wildlife Management, the North Slope Borough Fish and Game Management Committee, the Alaska Eskimo Whaling Commission, the Kawerak Natural Resources Department, the Alaska Beluga

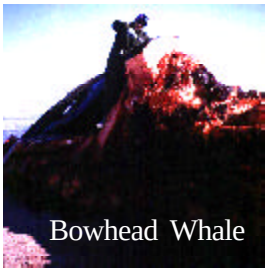
Beluga Hunters at Pt. Lay

Whale Committee, the Cook Inlet Marine Mammal Council, RurALCAP, the Eskimo Walrus Commission, the Alaska Department of Fish and Game, and the Alaska Department of Health and Social Services. The AMMTAP is also being used in special investigations of subsistence foods and human health.

Analyses of the marine mammal tissues for contaminants are conducted by the AMMTAP on a limited scale because only small amounts of funding are available and the costs for analyses is high. In order to expand the possibility of analyses, the project actively seeks additional funding as well as other researchers with their own funding who are interested in analyzing the archived samples. If samples are provided to outside investigators, the researchers are required to provide the results to the AMMTAP in a timely manner and to contributing parties and appropriate agencies who have a need for the results. The researchers are also required to participate in a NIST quality assurance program to insure that the results are accurate and comparable to studies done elsewhere.

So far, most of the analyses for pesticides, PCBs, and trace elements (including potentially toxic heavy metals) have been conducted on beluga whales (Point Lay, Point Hope, and Point Lay), bowhead whales (Barrow), and ringed seals (Nome). The results have been provided in both technical reports, scientific journal articles, and special summary reports for local organizations.

Preliminary comparisons of specimens collected through the AMMMTAP with those collected elsewhere have suggested several trends important to Alaska and the U. S. Arctic. For example, phocid (earless) seals from Alaska generally were lower in overall levels of organochlorine (OC) contaminants than seals from the mainland coastal U. S. They also were substantially lower in OC's than seals in most other parts of the Arctic. Correspondingly, Alaskan polar bears, which mainly eat phocid seals also tended to be low in OC's compared to bears throughout most of the rest of their circumpolar range. This finding, if upheld by continuing studies has great import to local native people who consume both seals and polar bears. Recent studies of OC's, heavy metals, and some other contaminants in Alaskan Beluga whales also have revealed important trends. The Cook Inlet stock, which may soon be declared depleted due to excessive hunting, has lower values of mercury, cadmium, and 9 OC's than almost all other beluga stocks across the North American Arctic.



Bowhead Whale

Reports documenting these and other AMMTAP related findings and other AMMTAP information is available from:

USGS:

Geoff York
USGS, Alaska Science Center
1011 East Tudor Road
Anchorage, AK 99503-6199
Telephone: (907) 786-3928
email: geoff_york@usgs.gov

NOAA Fisheries:

Dr. Teresa K. Rowles
NOAA Fisheries, PR2
1315 East-West Highway, SSMC-3
Silver Spring, MD 20910
Telephone: (301) 713-2322
email: Teri.Rowles@noaa.gov

NIST:

Dr. Paul R. Becker
NIST Charleston Laboratory
219 Fort Johnson Road
Charleston, SC 29412-9110
Telephone: (843) 762-8503
email: Paul.Becker@noaa.gov